UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/248,103	02/11/1999	TADAO NAKAZAWA	614.1921/PIK	8397

21171 7590 08/23/2002

STAAS & HALSEY LLP
700 11TH STREET, NW
SUITE 500
WASHINGTON, DC 20001

EXAMINER	
BELLO, AGUSTIN	

ART UNIT	PAPER NUMBER
2633	

DATE MAILED: 08/23/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/248,103	Applicant(s) NAKAZAWA ET AL.
	Examiner Agustin Bello	Art Unit 2633

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 21 June 2002.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-89 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-89 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 3-6, 8 .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Information Disclosure Statement

1. The information disclosure statement (IDS) submitted on 2/11/99, 6/4/99, 8/9/99, 3/23/01, were considered by the examiner in the previous office action. A copy of the initialed IDS statements was mailed with the office action dated 3/18/02. The examiner has included a supplemental copy of the considered IDS statements with this office action, as well as a copy of the considered IDS statement filed 6/18/02.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1-15, 18-22, 35-59, 62-68, 78-80, and 86-89 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hartmann (U.S. Patent No. 3,755,761).

Regarding Claims 1, 6, 8, 35, 43, 48, and 86-89, Hartmann teaches an apparatus comprising: first (reference numeral 56 in Figure 9) and second filters (reference numeral 58 in Figure 9) cascaded together so that the second filter filters light output from the first filter, the first and second filters having filtering characteristics controlled in accordance RF signals applied thereto (inherent in the transversal frequency filter claimed by Hartmann), wherein a phase of a beat generated by the RF signals applied to the first optical filter is different than a phase of a beat generated by the RF signals applied to the second optical filter (inherent in that the phase of the signals applied to the filter taught by Hartmann are phase shifted, thereby

producing beats in each of the filters having different phases: column 3 lines 9-17, column 8 lines 1-23). Hartmann differs from the claimed invention in that Hartmann fails to specifically teach that the filters used are optical filters. However, one skilled in the art would clearly have recognized that acousto-optic tunable filters are readily available and well known in the art. Furthermore, Hartmann suggests that the filters used in the system are optical filters in that he teaches that the filters are used to pass particular wavelengths (abstract) and that the invention is based on Rayliegh waves, an optical phenomena. Although Hartmann does not specifically teach that the filters are optical filters, one skilled in the art would clearly have recognized that AOTF filters, which are readily available and function according to the same principles as the filters taught by Hartmann, could have been used, thereby allowing the system of Hartmann to be used for optical systems. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to have used optical filters as the filters of Hartmann.

Regarding Claims 2, 36, 37, 41, and 50, Hartmann teaches an apparatus as in claim 1, wherein the difference in phase of the beats generated by the RF signals applied to the first and second optical filters is equal to a value obtained by dividing 180° by the number of stages of cascaded optical filters (inherent in that Hartmann teaches shifting the phase of a signal input to the second of two filters by 180°, thereby inducing a difference in the phase of the beats generated in each filter of 90°, as seen in Figures 6a, 6b and discussed in column 2 lines 51-57).

Regarding Claims 3, 7, 9, 44, 45, and 49, Hartmann teaches an apparatus as in claim 1, wherein the first and second filters are tunable filters (column 1 lines 1-14, 40-46, column 10 lines 21-24). As discussed above, acousto-optical tunable filters are readily available in the art and would have been obvious to one skilled in the art at the time the invention was made.

Regarding Claims 4, 39, 40, and 80, Hartmann teaches first (reference numeral 56 in Figure 9) and second tunable filters (AOTF) (reference numeral 58 in Figure 9) cascaded together so that the second filters light output from the first filter, the first and second filters having filtering characteristics controlled in accordance with RF signals applied thereto (inherent in the transversal frequency filter claimed by Hartmann), wherein a phase of a beat generated by the RF signals applied to the first filter is different than a phase of a beat generated by the RF signals applied to the second filter (inherent in that the phase of the signals applied to the filter taught by Hartmann are phase shifted, thereby producing beats in each of the filters having different phases: column 3 lines 9-17, column 8 lines 1-23). As discussed above, acousto-optical tunable filters are readily available in the art and would have been obvious to one skilled in the art at the time the invention was made.

Regarding Claim 5, Hartman teaches an apparatus as in claim 4, wherein the difference in the phase of the beats generated by the RF signals applied to the first and second AOTFs is equal to a value obtained by dividing 180° by the number of stages of cascaded AOTFs (inherent in that Hartmann teaches shifting the phase of a signal input to the second of two filters by 180°, thereby inducing a difference in the phase of the beats generated in each filter of 90°, as seen in Figures 6a, 6b and discussed in column 2 lines 51-57).

Regarding Claims 46, 51 Hartmann teaches a phase shifter causing the phase of the RF signal controlling the first optical filter to be different than a phase of the RF signal controlling the second optical filter (column 2 lines 64-66).

Regarding Claims 10, 18, 53, 62, and 64, Hartmann teaches a first filter (reference numeral 56 in Figure 9, reference numeral 136 in Figure 10) filtering an input light including a

plurality of wavelengths to output first and second output lights (see Figures 9,10), the first output light excluding a wavelength of the plurality of wavelengths selected in accordance with RF signals applied to the first optical filter for controlling filtering characteristics of the first optical filter, and the second output light including said selected wavelength (see tables 1 and 2); a second optical filter (reference numeral 58 in Figure 9, reference numeral 142 in Figure 10) filtering the first output light in accordance with RF signals applied to the second optical filter for controlling filtering characteristics of the second optical filter, having a difference in the phase of a beat signal created in the first and second filters (inherent in that the phase of the signals applied to the filter taught by Hartmann are phase shifted, thereby producing beats in each of the filters having different phases: column 3 lines 9-17, column 8 lines 1-23). Hartmann differs from the claimed invention in that Hartmann fails to specifically teach a third optical filter filtering the second output light in accordance with RF signals applied to the third optical filter for controlling filtering characteristics of the third optical filter, wherein a phase of a beat generated by the RF signals applied to the first optical filter is different than a phase of a beat generated by the RF signals applied to the second optical filter and a phase of a beat generated by the RF signals applied to the third optical filter. However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have cascaded a plurality of filters, thereby allowing each filter to extract a particular wavelength or group of wavelengths. Furthermore, the teachings of Hartmann would have suggest to one skilled in the art that it is possible to cascade a plurality of filters (see Figure 9, 10) in a manner that would allow for the extraction of a particular wavelength or group of wavelengths. One skilled in the art would have been motivated to cascade a third, fourth or fifth filter to filter the second output of the first filter

in order to provide a higher degree of accuracy in the extraction of a particular wavelength or group or wavelengths by narrowing the filter passband of the third filter so that the output of the filter only included the desired wavelength or group of wavelengths. Furthermore, as discussed above, acousto-optical tunable filters are readily available in the art and would have been obvious to one skilled in the art at the time the invention was made. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to have cascaded a third optical filter from the first optical filter wherein the third optical filter creates a beat with a phase that is different from the phase of the beat created by the first filter since doing so would have provided a more accurate filter as suggested by the teachings of Hartmann and since it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art, *St. Regis Paper Co. of v. Bemis Co., 193 USPQ.*

Regarding Claims 11, 54, and 63 since Hartmann inherently teaches that the phase of the beats generated by an RF signal applied to a filter are controllable, it would have been obvious to one skilled in the art at the time the invention was made to have adjusted the phase difference between the signals input to the second and third cascaded optical filter so that the RF signal input would have the same phase. Doing so would have involved only routine skill or experimentation for one skilled in the art. Furthermore, Hartmann teaches inputting an in-phase RF signal to cascaded filters, thereby resulting in the phase of the beats generated by the RF signals being the same.

Regarding Claims 12-14, 19-21, 55-57, and 66-68, and Hartmann teaches that the passband and stopband of each filter are fully selectable, thereby allowing one skilled in the art to select or reject any wavelength input from a multi-wavelength signal (see Table 1, 2).

Regarding Claims 15 and 22, although the teachings of Hartmann fail to specifically teach that at least two wavelengths are extracted from the plurality of wavelengths input to the filter, the teachings of Hartmann would have suggested to one skilled in the art that it is possible to extract a group of wavelengths since the passband and stopband of each filter is fully adjustable (column 3 lines 9-17), thereby allowing a particular frequency band out of a group of many frequencies to be selected (column 2 lines 29-32). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to have extracted at least two wavelengths from the plurality of wavelengths input to the filter by adjusting the passband and stop band of each filter according to the teachings of Hartmann.

Regarding Claims 38, 42, 47, 52, 58, and 65, Hartmann teaches that the frequency of the RF signal input to each filter is selectable, thereby allowing the filter to extract particular frequencies from the multi-frequency input signal (column 10 lines 18-24). Without departing from the scope of the invention, one skilled in the art would clearly have recognized that it would have been possible to set the frequency of each filter to the same frequency, thereby double filtering the signal while allowing a difference in the phase of the beats produced by the RF signal to occur. One skilled in the art would have been motivated to filter the signal according to the same RF signal frequency while allowing a difference in the phase of the beats produced by the RF signal to occur in order to allow the signal to add constructively in one direction of propagation through the filters while canceling each other in the opposite direction of propagation. Therefore, since Hartmann teaches that the RF signals input to the cascaded filters is selectable, it would have been obvious to one skilled in the art at the time the invention was made to have set the frequency input to the first and second filters to the same frequency.

Regarding Claims 59 and 79 Hartmann teaches an apparatus as in claim 53, wherein the first, second, and third optical filters are acousto-optical tunable filters (column 1 lines 1-14, 40-46, column 10 lines 21-24).

Regarding Claim 78, as discussed in claims 1 and 10, Hartman teaches an apparatus comprising: a first optical filter receiving an input light including a plurality of wavelengths and a second optical filter filtering the light output from the first optical filter to output a light having wavelengths selected in accordance with RF signals controlling the second optical filter, the RF signals controlling the second optical filter including at least one RF signal having a frequency which is the same as, but having a phase which is different than, that of an RF signal controlling the first optical filter. Hartmann differs from the claimed invention in that Hartmann fails to specifically teach filtering the input light to output a light having at least two wavelengths of the plurality of wavelengths and selected in accordance with RF signals controlling the first optical filter, the RF signals including at least two RF signals corresponding, respectively, to the selected at least two wavelengths and having frequencies suitable for causing the first optical filter to select the corresponding wavelengths. However, the teachings of Hartmann would have suggested to one skilled in the art that it is possible to extract a group of wavelengths since the passband and stopband of each filter is fully adjustable (column 3 lines 9-17), thereby allowing a particular frequency band out of a group of many frequencies to be selected (column 2 lines 29-32). Furthermore, it would have been obvious to one skilled in the art that this would have been accomplished by using two RF frequencies to select the two wavelengths. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to have extracted

at least two wavelengths from the plurality of wavelengths input to the filter by adjusting the passband and stop band of each filter according to the teachings of Hartmann.

4. Claims 16, 17, 23, 24, 60, 61, and 69-70 and are rejected under 35 U.S.C. 103(a) as being unpatentable over Hartmann in view of Tada (U.S. Patent No. 5,994,980).

Regarding Claims 16, 23, 60, and 69, Hartmann teaches the limitations of claim 10 as discussed above, and further teaches cascading a plurality of filters on a single substrate (reference numeral 56, 58, 98 in Figure 7, reference numeral 164, 166, 168 in Figure 11, column 2 lines 45-67, column 11 lines 43-49), but differs from the claimed invention in that Hartmann fails to specifically teach a reflecting device on the substrate, wherein the first output light reflects from the first optical filter to the second optical filter to be filtered by the second optical filter, and the second output light reflects from the first optical filter to the third optical filter to be filtered by the third optical filter. However, one skilled in the art would clearly have recognized that in the cascaded filter system taught by Hartmann, it would have been beneficial to employ the use of a reflector to specifically reflect a particular wavelength to a particular output or secondary filter. Furthermore, Tada, in the same field of endeavor, teaches that it is well known in the art that reflectors are incorporate in tunable filters (column 6 lines 34-37), thereby being incorporated on the same substrate as the tunable filter. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to have included a reflector within the filter system taught by Hartmann, the reflector being on the same substrate as the filters, in order to direct a particular signal to a particular output as taught by Tada in the filter system of Hartmann.

Regarding Claims 17, 24, 61, and 70, the combination of Hartmann and Tada teach that it is well known to incorporate reflectors within a filter on the same substrate, but differs from the claimed invention in that the combination of references fails to specifically teach that the first and second output light reflected by the first filter do not reflect back to the first filter. However, Official Notice is taken that it is well known in the art to prevent a reflected signal from reflecting back into an optical device via an isolator or a grating in order to prevent damage to that optical device. One skilled in the art would clearly have recognized that it would have been beneficial to prevent the reflected light from reflecting back into a first filter via an isolator or grating, thereby avoiding damage to the filter. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to have prevented light reflected from the first filter from being reflected back into the filter in order to prevent damage to the filter.

5. Claims 25-32, 71-73, 74-77, and 81-85 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hartmann in view of O'Donnell (WO 97/10658).

Regarding Claims 25, 71, Hartmann teaches a first optical filter (reference numeral 56 in Figure 9, reference numeral 136 in Figure 10) filtering an input light including a plurality of wavelengths to output first and second output lights (see Figures 9,10), the first output light excluding a wavelength of the plurality of wavelengths selected in accordance with RF signals applied to the first optical filter for controlling filtering characteristics of the first optical filter, and the second output light including said selected wavelength (see tables 1 and 2); a second optical filter (reference numeral 58 in Figure 9, reference numeral 142 in Figure 10) filtering the first output light in accordance with RF signals applied to the second optical filter for controlling filtering characteristics of the second optical filter, having a difference in the phase of a beat

signal created in the first and second filters (inherent in that the phase of the signals applied to the filter taught by Hartmann are phase shifted, thereby producing beats in each of the filters having different phases: column 3 lines 9-17, column 8 lines 1-23). Hartmann differs from the claimed invention in that Hartmann fails to specifically teach a third optical filter filtering the second output light in accordance with RF signals applied to the third optical filter for controlling filtering characteristics of the third optical filter, wherein a phase of a beat generated by the RF signals applied to the first optical filter is different than a phase of a beat generated by the RF signals applied to the second optical filter and a phase of a beat generated by the RF signals applied to the third optical filter. However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have cascaded a plurality of filters, thereby allowing each filter to extract a particular wavelength or group of wavelengths. Furthermore, the teachings of Hartmann would have suggest to one skilled in the art that it is possible to cascade a plurality of filters (see Figure 9, 10) in a manner that would allow for the extraction of a particular wavelength or group of wavelengths. One skilled in the art would have been motivated to cascade a third, fourth or fifth filter to filter the second output of the first filter in order to provide a higher degree of accuracy in the extraction of a particular wavelength or group or wavelengths by narrowing the filter passband of the third filter so that the output of the filter only included the desired wavelength or group of wavelengths. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to have cascaded a third optical filter from the first optical filter wherein the third optical filter creates a beat with a phase that is different from the phase of the beat created by the first filter since doing so would have provided a more accurate filter as suggested by the teachings of Hartmann and since it has been

held that mere duplication of the essential working parts of a device involves only routine skill in the art, *St. Regis Paper Co. of v. Bemis Co., 193 USPQ.*

The invention of Hartmann further differs from the claimed invention in that Hartmann fails to specifically teach a phase controller controlling the phases of the RF signals applied to the first, second and third filters with respect to each other. However, one skilled in the art would clearly have recognized that it would have been beneficial to use a controller for controlling the phase of the RF signals applied to the filters since doing so would have allowed a more precise extraction of specific channels, while allowing for a greater range of channels to be extracted. Furthermore, O'Donnell, in the same field of endeavor, teaches that it is well known in the art to use a control circuit for adjusting the phase of an RF signal being applied to an AOTF (page 10 lines 6-11). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to have used a control circuit as taught by O'Donnell to control the phase of the RF input signal applied to the first second and third filters in order to allow each filter to more precisely extract a particular channel while allowing each filter to extract a greater range of channels.

Regarding Claims 26, 72, and 73, since Hartmann inherently teaches that the phase of the beats generated by an RF signal applied to a filter are controllable, it would have been obvious to one skilled in the art at the time the invention was made to have adjusted the phase difference between the signals input to the second and third cascaded optical filter via the control circuit taught by O'Donnell so that the beats generated by the RF signal would have either a different phase than that of the first filter or so that the there would be no phase difference between the RF signal input to the second and third filter. Doing so would have involved only routine skill or

experimentation for one skilled in the art. Furthermore, Hartmann teaches inputting an in-phase RF signal to cascaded filters, thereby resulting in the phase of the beats generated by the RF signals being the same.

Regarding Claims 27-30, Hartmann teaches that the passband and stopband of each filter are fully selectable, thereby allowing one skilled in the art to select or reject any wavelength input from a multi-wavelength signal (see Table 1, 2).

Regarding Claims 31, 81, 82, 84, and 85, Hartmann teaches a first optical filter (reference numeral 56 in Figure 9, reference numeral 136 in Figure 10) filtering an input light including a plurality of wavelengths to output first and second output lights (see Figures 9,10), the first output light excluding a wavelength of the plurality of wavelengths selected in accordance with RF signals applied to the first optical filter for controlling filtering characteristics of the first optical filter, and the second output light including said selected wavelength (see tables 1 and 2); a second optical filter (reference numeral 58 in Figure 9, reference numeral 142 in Figure 10) filtering the first output light in accordance with RF signals applied to the second optical filter for controlling filtering characteristics of the second optical filter, having a difference in the phase of a beat signal created in the first and second filters (inherent in that the phase of the signals applied to the filter taught by Hartmann are phase shifted, thereby producing beats in each of the filters having different phases: column 3 lines 9-17, column 8 lines 1-23). Hartmann differs from the claimed invention in that Hartmann fails to specifically teach a third, fourth, or fifth optical filter filtering the output light from the first second filters in accordance with RF signals applied to the optical filters for controlling filtering characteristics of the optical filters. However, it would have been obvious to one having ordinary skill in the art at the time the

invention was made to have cascaded a plurality of filters, thereby allowing each filter to extract a particular wavelength or group of wavelengths. Furthermore, the teachings of Hartmann would have suggest to one skilled in the art that it is possible to cascade a plurality of filters (see Figure 9, 10) in a manner that would allow for the extraction of a particular wavelength or group of wavelengths. One skilled in the art would have been motivated to cascade a third, fourth or fifth filter to further filter the outputs of the first filter and second filters in order to provide a higher degree of accuracy in the extraction of a particular wavelength or group or wavelengths by narrowing the filter passband of the third, fourth, or fifth filters so that the output of the filter only included the desired wavelength or group of wavelengths. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to have cascaded a third, fourth, or fifth optical filter from the first and second optical filters since doing so would have provided a more accurate filter as suggested by the teachings of Hartmann and since it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art, *St. Regis Paper Co. of v. Bemis Co., 193 USPQ.*

Regarding Claim 32, the invention of Hartmann further differs from the claimed invention in that Hartmann fails to specifically teach a phase controller controlling the phases of the RF signals applied to the first, second, third, fourth, and fifth optical filters with respect to each other. However, one skilled in the art would clearly have recognized that it would have been beneficial to use a controller for controlling the phase of the RF signals applied to the filters since doing so would have allowed a more precise extraction of specific channels, while allowing for a greater range of channels to be extracted. Furthermore, O'Donnell, in the same field of endeavor, teaches that it is well known in the art to use a control circuit for adjusting the

phase of an RF signal being applied to an AOTF (page 10 lines 6-11). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to have used a control circuit as taught by O'Donnell to control the phase of the RF input signal applied to the first, second, third, fourth, and fifth filters in order to allow each filter to more precisely extract a particular channel while also allowing each filter to extract a greater range of channels.

Regarding Claim 74, Hartmann teaches that the frequency of the RF signal input to each filter is selectable, thereby allowing the filter to extract particular frequencies from the multi-frequency input signal (column 10 lines 18-24). Without departing from the scope of the invention, one skilled in the art would clearly have recognized that it would have been possible to set the frequency of each filter to the same frequency, thereby double filtering the signal while allowing a difference in the phase of the beats produced by the RF signal to occur. One skilled in the art would have been motivated to filter the signal according to the same RF signal frequency while allowing a difference in the phase of the beats produced by the RF signal to occur in order to allow the signal to add constructively in one direction of propagation through the filters while canceling each other in the opposite direction of propagation. Therefore, since Hartmann teaches that the RF signals input to the cascaded filters is selectable, it would have been obvious to one skilled in the art at the time the invention was made to have set the frequency input to the first and second filters to the same frequency.

Regarding Claims 75-77, Hartmann teaches that the passband and stopband of each filter are fully selectable, thereby allowing one skilled in the art to select or reject any wavelength input from a wavelength-wavelength signal (see Table 1, 2).

Regarding Claim 83 since Hartmann inherently teaches that the phase of the beats generated by an RF signal applied to a filter are controllable, it would have been obvious to one skilled in the art at the time the invention was made to have adjusted the phase difference between the signals input to the second and third cascaded optical filter via the control circuit taught by O'Donnell so that the beats generated by the RF signal would have either a different phase than that of the first filter or so that there is no phase difference in the RF signal input to the second and third filter and fourth and fifth filter. Doing so would have involved only routine skill or experimentation for one skilled in the art. Furthermore, Hartmann teaches inputting an in-phase RF signal to cascaded filters, thereby resulting in the phase of the beats generated by the RF signals being the same.

6. Claims 33-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hartmann in view of O'Donnell and Tada.

Regarding Claim 33, the combination of Hartmann and O'Donnell teaches the limitations of claim 25 as discussed above, and further teaches cascading a plurality of filters on a single substrate (reference numeral 56, 58, 98 in Figure 7, reference numeral 164, 166, 168 in Figure 11, column 2 lines 45-67, column 11 lines 43-49 of Hartmann), but differs from the claimed invention in that the combination of references fails to specifically teach a reflecting device on the substrate, wherein the first output light reflects from the first optical filter to the second optical filter to be filtered by the second optical filter, and the second output light reflects from the first optical filter to the third optical filter to be filtered by the third optical filter. However, one skilled in the art would clearly have recognized that in the cascaded filter system taught by Hartmann and O'Donnell, it would have been beneficial to employ the use of a reflector to

specifically reflect a particular wavelength to a particular output or secondary filter. Furthermore, Tada, in the same field of endeavor, teaches that it is well known in the art that reflectors are incorporate in tunable filters (column 6 lines 34-37), thereby being incorporated on the same substrate as the tunable filter. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to have included a reflector within the filter system taught by Hartmann and O'Donnell, the reflector being on the same substrate as the filters, in order to direct a particular signal to a particular output as taught by Tada in the filter system of Hartmann and O'Donnell.

Regarding Claim 34, the combination of Hartmann, O'Donnell, and Tada teach that it is well known to incorporate reflectors within a filter on the same substrate, but differs from the claimed invention in that the combination of references fails to specifically teach that the first and second output light reflected by the first filter do not reflect back to the first filter. However, Official Notice is taken that it is well known in the art to prevent a reflected signal from reflecting back into an optical device via an isolator or a grating in order to prevent damage to that optical device. One skilled in the art would clearly have recognized that it would have been beneficial to prevent the reflected light from reflecting back into a first filter via an isolator or grating, thereby avoiding damage to the filter. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to have prevented light reflected from the first filter from being reflected back into the filter in order to prevent damage to the filter.

Response to Arguments

7. Applicant's arguments with respect to claims 1-89 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Gottlieb, Hunsinger, Okamoto, Yamada, and Malocha for teaching phase shifting of an input signal to an AOTF.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Agustin Bello whose telephone number is (703)308-1393. The examiner can normally be reached on M-F 8:30-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on (703)305-4729. The fax phone numbers for the organization where this application or proceeding is assigned are (703)872-9314 for regular communications and (703)872-9314 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)305-3900.

AB
August 22, 2002

Leslie Pascal
LESLIE PASCAL
PRIMARY EXAMINER